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AMONG MY AUTOGRAPHS.

By DAVID EUGENE SMITH, Columbia University.

EDITOR'S NOTE.—The large collection of autograph letters of famous mathematicians, now in the library of Professor Smith, includes many hundred valuable documents, most of them unpublished, and many of them either containing valuable historical information or giving such an intimate view of their writers as to be interesting to all who care for the mathematical sciences. On this account the editors have asked Professor Smith to prepare for the MONTHLY a series of brief articles under the above title, giving to its readers the opportunity of knowing something of the interesting letters in his collection.

1. DELAMBRE AND THE FOUNDER OF THE SMITHSONIAN INSTITUTION.

Among my autograph letters are upwards of twenty written by Delambre,¹ some of them containing the calculations made by him in the course of his survey for the metric system, and all of them giving evidence of the stirring times in which he lived. One of these letters possesses particular interest for American scientists, since it offers a subject for speculation as to the possible loss to our country of the Smithsonian Institution if it had not been written. The letter, in translation, is as follows:

PARIS, 16 April, 1809.

The Perpetual Secretary for the mathematical sciences, to His Excellency Monsieur le Comte d' Hunebourg, Minister of War.

Monsieur le Comte,

Permit me, in the name of the Class of the Mathematical and Physical Sciences of the Institute, to recommend to your benevolence M. Smithson, a member of the Royal Society of London and at the present time a prisoner of war at Hamburg.

Mr. Banks, president of the Royal Society and foreign associate of the Institute, has sent to us a very pressing letter in behalf of his friend, reminding us of the various reasons why M. Smithson is entitled to the esteem of savants. I take the liberty of joining him in his entreaty. Your excellency will readily see the strong reasons which prompt the Class to wish, on this happy and favorable occasion, to act as it has several times under similar circumstances, and to be able to reciprocate the protection and generous assistance which M. Banks has given to so many French savants in these unhappy times.

I beg Your Excellency to accept the assurances of my most respectful sentiments.

DELAMBRE.

The letter contains two official memoranda, one referring the case to the proper subordinate, and the other being a favorable recommendation.

The M. Banks mentioned in the letter was Sir Joseph Banks, a scientist of recognized standing, who had been for some years president of the Royal Society. He was an Oxford man, was made a baronet in 1781, and became an associate member of the Institute of France in 1802.

¹ Jean Baptiste Joseph Delambre (1749–1822) was a pupil of and a collaborator with La Lande, following his master as professor of astronomy in the Collège de France. His four histories of astronomy, *ancienne* (1817), *au moyen âge* (1819), *moderne* (1821), and *au dix-huitième siècle* (posthumous, 1827) are highly esteemed.

The M. Smithson was James Smithson, then a man of forty-four, the natural son of Hugh Smithson, later Duke of Northumberland. It may have been with his thoughts upon the bar sinister that he afterwards wrote:

"The best blood of England flows in my veins. On my father's side I am a Northumberland, on my mother's I am related to kings; but this avails me not. My name shall live in the memory of men when the titles of the Northumerlands and the Percys are extinct and forgotten."

Smithson spent most of his time on the Continent, and, evidently in the conquest of northern Germany, he had fallen into Napoleon's hands as a civilian prisoner of war. Delambre wrote this letter on the day that the emperor was hastening to the Battle of Ratisbon, where he defeated the Archduke Charles of Austria. This was seventeen years before Smithson made his will (October 23, 1826), and it is interesting to speculate upon the question of the founding of the Smithsonian Institution if Delambre had not written the letter.

QUESTIONS AND DISCUSSIONS.

EDITED BY W. A. HURWITZ, Cornell University, Ithaca, N. Y.

NEW QUESTION.

42. In connection with the questions of Kakeya [1920, 256], Professor W. B. Ford is led to the following inquiry: A line-segment AB is to be moved in its plane to a new position $A'B'$. How should this be done in order that the area generated may, to the greatest extent possible, be passed over three times?

Professor Ford has proved that if the generated area is to be passed over, to the greatest possible extent, but *two* times, AB should be rotated about the intersection of the perpendicular bisectors of AB and $A'B'$.

DISCUSSIONS.

Professor Campbell considers below the conditions under which the expression $P(x, y)dx + Q(x, y)dy$ represents an exact differential. The ordinary form of the criterion is $\partial Q / \partial x = \partial P / \partial y$, and involves assumptions about the derivatives of P and Q . Professor Campbell gives a form of necessary and sufficient condition which is applicable even though these derivatives fail to exist. The condition which he derives involves forms which are usually explicitly used in the proof of the ordinary theorem; but it does not seem that his statement of the condition as an end in itself, is found in the literature. He gives also a generalization to the case of n variables. It seems that the restriction to a rectangular region, alluded to in a footnote, is essential for the accuracy of the proof.

Professor McKelvey contributes some remarks on a universally troublesome question,—the presentation of the theory of limits in secondary schools. While his indication that it is never of importance whether or not a variable reaches its limit may require occasional modification, such modification surely bears, not on the question of the general meaning of limit, but on the special problem